The Behavior Analyst 1990, 13, 205–210 No. 2 (Fall)

The Masters Thesis in Applied Behavior Analysis: Rationale, Characteristics, and Student Advisement Strategies

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The conceptualization and successful production of original scholarship in the form of a dissertation is universally accepted as the capstone requirement for the doctoral degree. Historically, the dissertation has been a non-negotiable requirement for receiving the doctorate in virtually all fields, including applied behavior analysis. The traditional, and we believe a still valid, view is that the successful completion of the dissertation demonstrates that one is capable of contributing to the knowledge base of his or her discipline.

The thesis (the dissertation's parallel at the masters degree level), however, is not a standard requirement across institutions, programs, or faculty advisors. Most graduate schools offer two options for completing the final requirement for a masters degree: writing a thesis or taking a comprehensive examination. In colleges of education the comprehensive exam option is chosen by an overwhelming majority of students, making the masters thesis in education an almost nonexistent phenomenon. (As a case in point: not counting the 10 graduates of our program, only 10% of 163 masters degree recipients from The Ohio State University College of Education during Spring and Summer Quarters, 1989 chose the thesis option.) Since approximately one-half of the membership of the Association for Behavior Analysis consists of faculty and students in colleges of education (Vargas, 1989), it is likely a large percentage of masters level behavior analysts have not completed a thesis as part of their graduate training. We believe a thesis requirement for all masters-level students in applied behavior analysis benefits the research participants, graduate students, faculty advisors, and the behavior analysis community in ways to be discussed below.

Preparation of this manuscript was supported in part by a Leadership Training Grant (#G008715568) from the Office of Special Education Programs, U.S. Department of Education. Requests for reprints or materials used in the thesis seminar can be addressed to any of the authors: Applied Behavior Analysis Program, Department of Educational Services and Research, The Ohio State University, 356 Arps Hall, 1945 N. High St., Columbus, OH, 43210-1172.

Rationale for Requiring a Masters Thesis

Benefits for research participants. Like all behavior analysis studies that meet the *applied* criterion, our students' thesis research is designed primarily to improve socially important behavior. While design flaws and confounding variables may limit the scientific quality of any experiment, our experience suggests that few theses conceived and carried out by students with a commitment to their subjects' well-being fail to benefit the lives of the participants in some way. Most of the theses conducted by our students involve school-age children as experimental subjects, and the primary benefit to these children consists of measured improvements in the target behavior(s) during the course of the research. For most participants, the data collected on their behavior as thesis subjects represents the most systematic analysis of their school performance ever conducted. Long after the formal study has been completed many participants continue to benefit from changes in instructional and/or behavior management techniques that were discovered to be effective during the thesis.

Most thesis research involves participants in addition to the subjects. For example, as part of their theses our students

sometimes train classroom teachers or parents to deliver instruction or implement behavioral contingencies. These individuals benefit from learning about the principles of behavior and practicing behavior change procedures.

Benefits for the graduate student. Although most students initially view the long journey toward thesis completion as a "forced march" to be avoided if at all possible, in follow-up evaluations with our students, almost all identify the thesis as the most valuable experience in their graduate training. Thesis students acquire two kinds of appreciation that few who have not conducted applied research can fully understand. The process of completing a thesis increases students' respect for the complexity of behavior and the difficulty of purposeful behavior change, and most students discover that research, while extremely challenging and at times frustrating, is exciting.

Specifically, some of the more important benefits include the opportunity to: (a) become an emerging expert on the literature of a specific area of behavior analysis, (b) experience the excitement of observing behavior change while systematically manipulating experimental variables, (c) develop technical writing and presentation skills well beyond those required to pass individual classes, and (d) become a more sophisticated consumer of research. Although a thesis is not the only way in which masters students can achieve these outcomes, in our opinion the intensity and duration of behavior analytic involvement required by a thesis generates these benefits more consistently than alternative activities. The behavior change demonstration project used by some graduate programs as an alternative to the thesis seldom requires the level of involvement needed to complete a thesis. Yet, developing proposals, reviewing the literature, coordinating personnel and other resources, working with school and agency administrators and staff, collecting and analyzing data, and technical writing are behaviors that will constitute a major part of the masters graduate's repertoire as a working professional.

Benefits for university faculty. Although the cost of a thesis requirement is high in terms of faculty involvement, directing thesis research has significant benefits for faculty. It is rewarding to observe the behavior change and analytical repertoires of one's students develop during their thesis work and to see data representing positive changes in the lives of study participants. Advising thesis students also enhances the professional development of faculty. A thesis requirement ensures that all graduate faculty members in a program are involved in ongoing research. In a discipline as young and rapidly changing as applied behavior analysis, it is difficult to envision how a professor who is not engaged in research can maintain his or her currency for teaching behavior analysis in the classroom. The direction of thesis research increases the faculty member's familiarity with the literature in those areas his or her students are investigating. This information combined with the enthusiasm for applied experimentation generated by working with thesis students, can function to improve a professor's teaching effectiveness.

Research productivity is expected for the development of an academic career. A candidate for academic promotion, especially to the rank of professor, is expected to have developed clear themes in his or her research. Some thesis students will choose to conduct systematic replications that help build upon a thematic line of research supervised by a faculty member or a team of colleagues. Multiple investigations of a functional relation over the course of several years increase the probability that both the thesis student's and the professor's research will be more productive (Johnston & Pennypacker, 1980).

Benefits for the discipline. Behavioral scientists experimenting in applied settings know that even the best laid plans may be rendered irrelevant by uncontrolled variables. Even the most experienced and sophisticated researchers do not produce publishable data with every experiment. In almost every instance, the thesis is the masters student's first op-

portunity to manage a formal research effort in an applied setting. Nevertheless, some masters students do produce data of sufficient importance and quality to warrant dissemination to the discipline. Faculty encourage students whose research is especially well done to present their work at professional meetings, and to coauthor papers reporting their findings to the literature (e.g., Cooke, Heron, & Heward, 1980; Marshall & Heward, 1979; Narayan, Heward, Gardner, Courson, & Omness, in press; Parson & Heward, 1979).

Characteristics of a Good Thesis in ABA

In addition to helping our students develop and conduct their thesis research to encompass the defining characteristics of applied behavior analysis (Baer, Wolf, & Risley, 1968, 1987), we encourage them to take into account the following five considerations.

A systematic place in the literature. Most graduate students initially interpret the requirement that a thesis be an "original" piece of research to mean they must study a never-before investigated phenomenon. While some students are disappointed to find there are few if any behavioral phenomena that have not been the focus of previous research in some form, most are relieved to learn that *original* in this context means only that the data reported as results of the study must be the product of the specific combination of subject, setting, and experimental variables manipulated by the graduate student in conducting the thesis. We point out the problems inherent in some of the "behavioral science" literatures characterized by too few replications and encourage our students to pursue systematic replications of published studies in an effort to contribute to a more thorough analysis of functional relations (Deitz, 1982; Hayes, Rincover, & Solnick, 1980; Pennypacker, 1981).

Simple is usually better. We encourage students to "think small" when conceptualizing their thesis. As a general rule, the most powerful statements regarding functional relations can be made when elegant, straightforward designs direct the data toward a single primary question. We help our students create a rank-ordered list of possible research questions using a combination of the demands of the applied setting, the published literature, and their own interests. The thesis is then designed in an attempt to produce good data in response to one or two of these key research questions (Sidman, 1960).

Form follows function. Only after the thesis student has determined his or her research question(s) can the issues of experimental design be properly addressed. When the elements of an experiment are arbitrarily forced into a predetermined "design," the resulting data may be unrelated to the questions the investigator asked of nature (Johnston & Pennypacker, 1980). The student must determine which type of experimental reasoning each element of the proposed design will contribute to the study.

> What elements of the design enable prediction, verification, and replication? Is the design appropriate for the research questions being addressed? Does the design effectively control for confounding variables? Does the design provide the basis for comparative, component, and/or parametric analyses if such questions are warranted? (Cooper, Heron, & Heward, 1987, p. 247)

Doable. While outside sources of support are sometimes available, most masters students must conduct their thesis research with limited personal and professional resources at their disposal. When a thesis student proposes an investigation well beyond the resources at his or her disposal, we suggest a task analysis of the larger, undoable study. In most instances, the task analysis yields a list of not only significant, but doable, thesis topics.

Student interest. Students should be interested in and excited about the thesis topics. Over the 9–12 month period during which most students plan and complete a masters thesis, they will be thinking, reading, writing, observing, and talking (to anyone who will provide some semblance of audience control) about the functional relations that have become the focus of their research.

Student Advisement

Students complete a masters thesis in three stages: (1) developing the proposal, (2) conducting the experiment, and (3) writing the thesis. Recognizing each student's need to receive guidance and support through each stage as well as the many other demands on faculty time, we have developed the following three interrelated strategies for thesis advisement.

Thesis seminar. The thesis seminar consists of four, 2–3 hour sessions scheduled biweekly in faculty members' homes. The students' shared interest in simply surviving the thesis requirement soon evolves into spirited discussions about the conceptualization, design, and conduct of experiments. In addition to fostering a genuine esprit de corps, the thesis seminar provides the forum for faculty to present the specific steps and issues associated with each stage of the thesis process. Covering the requirements that must be met by all thesis students regardless of topic (e.g., parent permission forms, Graduate School deadlines) in a group seminar format is a cost effective use of faculty time while ensuring that all students receive the same basic information.

The primary objective of the seminar is the completion of a thesis proposal describing the rationale for the study in context of published literature, specific research questions, subjects and setting(s), definition and measurement of dependent variables, experimental design, evaluation of social validity, and detailed procedures. Toward that end, specific homework assignments are made at the end of each seminar session.

Perhaps one of the more important aspects of the seminar is the presentation by one or two recent M.A. graduates. In addition to presenting the formal aspects of their research, these alumni share their personal experiences in conducting a thesis and offer tips on how to anticipate the many logistical and methodological problems that can limit a study's effectiveness and scientific validity. It has been our experience, however, that the primary message our former students convey is that the thesis is worth doing, both personally and professionally.

Doctoral student co-advisement. The doctoral program in applied behavior analysis at Ohio State is designed to develop competence in the five skill areas described by Chase and Wylie (1985) in their task analysis of doctoral training in behavior analysis (i.e., conceptual, research, applied, communication, and administrative skills), plus a sixth competency area: teaching and advising. Prior to beginning their own dissertations, each ABA doctoral student assists two masters students with their thesis research. Faculty members pair each of their doctoral advisees with an M.A. student who is in the proposal development stage. Since there are more masters than doctoral students in the program, not all masters students will work with a doctoral student.

The doctoral student attends the thesis seminar and participates in all meetings between the thesis student and faculty advisor. In addition to serving as a general support person for the masters student, the doctoral student co-advisor offers suggestions regarding the purpose, design, and conduct of the thesis, edits drafts of the proposal and final document, helps the masters student arrange a work schedule with deadlines, and plans and implements contingencies to facilitate the meeting of those deadlines.

The masters student, doctoral student, and faculty member benefit from this co-advisement procedure. The masters student has a fellow graduate student who not only has first-hand knowledge of the thesis, but is personally committed to its success. The addition of a third person on the research team not only provides the extra personal resources needed for certain experimental tasks (e.g., data collection), but sometimes the doctoral student identifies and/or resolves a design or procedural problem that would have otherwise gone undetected or unresolved.

Thesis co-advisement has advantages for the doctoral student who (a) experiences a direct, supervised practicum in advising graduate student research; (b)

has another opportunity to participate in the conceptualization, design, and conduct of applied research (a competency area of primary importance in our doctoral training program); (c) receives valuable practice in editing, writing, and providing advice and feedback to the masters student; and (d) serves as a coauthor of any conference presentations and/or journal articles based on the thesis research.

The help with thesis advisement by just one or two Ph.D. students provides a significant time savings for the faculty member. A second faculty benefit is the opportunity to observe one's doctoral students in direct, sustained interaction as a behavior analyst/teacher. This arrangement offers numerous occasions to differentially reinforce critical aspects of the developing professional's verbal repertoire.

Student mentorship. Educators have been concerned with the high numbers of students who finish their coursework but fail to earn the masters or doctoral degree because they do not complete the thesis or dissertation. Suggestions for improvement most often focus on the role and responsibilities of the faculty advisor (Benet, 1977; Heiss, 1970; Spriestersbach & Henry, 1978).[1]

Each faculty advisor schedules regular meetings with each of his or her thesis students. These conferences are used to clarify questions and concerns not addressed during the thesis seminar and to address methodological issues idiosyncratic to the student's proposal. As students work to develop and write their proposals, mentorship consists of encouraging the continued refinement of research questions and procedural definitions and of praising written products even though the early narratives require greater specificity and grammatical polish.

During the data collection stage, mentorship focuses on data management and interpretation. Student, faculty advisor, and doctoral student co-advisor meet at least weekly to review graphed data, to determine when and how the independent variable should be manipulated, and to make changes in the originally proposed methodology as suggested by the data (Skinner, 1966). Mentorship during the final, and for many students most challenging, stage of the thesis process—producing a scholarly document that meets both the faculty advisor's criteria and the Graduate School's standards—is usually the most time consuming for all participants. Treatment outlines and drafts of each thesis chapter are exchanged and revised and different formats for displaying data are developed. Students are provided with specific guidelines for completing the thesis document, and some advisors document and publicly post on a chart in their office each student's completion of steps in the thesis process.

Conclusion

We have never collected data on the number of hours spent meeting with students, driving to and negotiating research sites in schools and agencies, serving as second observers, and reading, editing, and re-reading each successive draft of the four chapters that comprise the thesis. Had we known beforehand the level of involvement we were committing ourselves to, we may not have been so enthusiastic in our unanimous decision 14 years ago to require the thesis for all of our masters students. Nevertheless, our experience has convinced us that the benefits derived by the thesis requirement far

[1] Little experimental research evaluating strategies for supervising masters theses and doctoral dissertations has been reported in the literature. An exception is Dillon and Malott's (1981) evaluation of a behavioral system of supervision used with 34 M.A. thesis students over a 4-year period. A greater percentage of M.A. students in the behavioral system—weekly individual meetings with a Ph.D. student or faculty advisor, weekly large group meetings with other thesis students and advisors, and positive and negative points contingent upon completing specified thesis tasks that were reflected in the faculty advisor's letter of recommendation—graduated (81% versus 57% for other departmental students). The behavioral system students also took less time to complete their degree (a median of 20 months compared to 28 months, or two semesters faster).

outweigh its costs. We encourage colleagues who train masters-level applied behavior analysts to consider a research thesis as the capstone accomplishment for their students. Finally, we invite faculty in programs requiring a thesis to share the outcomes with the behavior analysis community.

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